Journal of Optical Technology (A Translation of Opticheskii Zhurnal) 2012 vol.79 N12, pages 781-788

Numerical modelling of thermal and gas-dynamic processes in a two-stage atomizer for analytical spectrometry

Nagulin K., Tsivil'Skiĭ I., Nazmiev R., Gil'Mutdinov A.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

Based on a numerical solution of the Navier-Stokes equations and the equations of molecular kinetics, a complete computer model of a two-stage atomizer has been developed for analytical spectrometry, consisting of a graphite crucible evaporator and a helical atomizer. The model correctly takes into account the heating of the atomizer by an electric current, the gas dynamics, and nonsteady-state thermal-exchange processes, as well as the evaporation and condensation of the atoms of the test substance. The developed model has been experimentally tested, and the results of the modelling agree well with the experimental data. © 2012 Optical Society of America.

http://dx.doi.org/10.1364/JOT.79.000781